

nued inability to establish the species upon a more solid basis than that of distinction of colour. The partial investigations which I have been enabled to make, strongly favour, however, the supposition that the superficial diagnostics are supported by others of more importance in the form of the crania, and in the structure and position of the musk pod. And, though I am still unable distinctly to expound these latter differences, I think it may stimulate curiosity to indicate summarily the three presumed species as marked by their diversities of colour, in the hope that attention may be thence drawn to the structural peculiarities which I believe to exist in the skulls, and in the musk bags.

1st. Species, *Moschus chrysogaster, nobis*. Bright sepia brown sprinkled with golden red; orbital region, lining, and base of ears, whole body below, and insides of the limbs, rich golden red or orange; a black-brown patch on the buttocks posteaally; limbs below their central flexures fulvescent.

2nd. Species, *Leucogaster, nobis*. Body above, and the limbs deeper brown sprinkled with fulvous: below the head, neck, and belly, together with the insides of the ears, and the orbits, hoary white.

3rd. Species, *Saturatus, nobis*. Throughout saturate dusky brown, somewhat paler below: chin only, and lining of the ears pale and hoary.

Drawings of the above animals were transmitted to London, through the Society, in May 1836.

I am Sir, your obedient servant,

B. H. HODGSON.

Nepal, April 15, 1839.

ART. IV.—On *Isinglass* in *Polynemus sele*, *Buch.*, a species which is very common in the *Estuaries of the Ganges*. By J. McCLELLAND, Assistant Surgeon.

There are nine species of *Polynemi*, or Paradise fishes, enumerated by authors, and although they are all pretty well described, I am not aware of any more valuable property being known regarding them than their excellence as an article of food, of which we have a familiar instance at this season in the *Pol. paradiseus*, or Mango-fish, *Tupsi Muchi* of the Bengalese.

Buchanan has five species in his work on Gangetic Fishes, but three of these are small, and probably varieties only of the *Tupsi*; two of them however, are of great size, and so common in the estuary of the Hoogly that I have seen numerous hackeries, or bullock carts, conveying them to the Calcutta bazar, during the cold season. They are not

confined to the estuary of the Hoogly, but probably extend to all the estuaries of the Ganges, as Buchanan says they do; and we know that Dr. Russell also describes two large species in his work, long since published, on the fishes of the Madras Coast.

The very valuable production, *Isinglass*, having been recently found to be yielded by one of the fishes of the Hoogly by a writer in Parbury's Oriental Herald, it became an interesting object to determine the systematic name of the fish affording an article so valuable, and to learn as much as possible regarding its habits. Having procured a specimen of this fish from the bazar, I was surprised to find it to be a *Polynemus*, or Paradise fish, although the writer alluded to described it as resembling a Shark. My surprise was not that a person unacquainted with fishes should compare it to a Shark, or to any thing else, but that a nearly allied species to the Mango-fish should contain a natatory vessel of such size and value, while that organ is quite absent in the Mango-fish itself, though a general character of nearly all others.

I had come to the determination never to describe single or detached species of fish, but as the object of this paper is to elucidate the commercial side of a question already before the public, I shall not pretend to offer any remarks on the scientific part of the subject, which is indeed beyond my province, as my observations have hitherto been confined to the fresh water species of India.

The species affording the Isinglass is the *Polynemus sele*, Buch.; *Sele*, or *Sulea*, of the Bengalese, described, but not figured, in the Gangetic Fishes; but if Buchanan's drawings had not been placed under a bushel since 1815, probably this useful discovery would have been sooner made, and better understood by the writer in Parbury's Oriental Herald, to whom we are indebted for it.

The annexed figure from Buchanan's unpublished collection at the Botanic Garden, conveys an excellent representation, about half size, of a specimen from which I obtained 66 grains of Isinglass: but as the writer in Parbury's Oriental Herald states that from half a pound to three quarters of a pound is obtained from each fish, we may suppose either that *P. sele* attains a much greater size than 24 pounds, the limit given to it by Buchanan, or, that the Isinglass is also afforded by a far larger species, namely *Polynemus teria*, Buch. or *Teria bhangon* of the Bengalese, *Muga jellee* of Russell, which Buchanan was informed sometimes equals three hundred and twenty pounds avoirdupois, and which I frequently have seen of an uniform size, that must have been from fifty to an hundred pounds at least, loading whole cavalcades of hackeries at once on their way to the Calcutta bazar, as I have already stated, during the cold season, when they would consequently seem to be very common.

Although the sound, or natatory vessel is the part of the fish that would afford the principal inducement to form fisheries, one of the obligations that speculators should be obliged to enter into with the Government is, to cure all parts of such fishes as might be taken for their sound. Considering the scarcity of fish in many parts of India, and the great, I may say unlimited demand for it in some parts of the country even when badly preserved, as well as the excellence of the flesh of all the *Polynemi*, the curing of these fishes might prove no less profitable to the parties themselves, than it would unquestionably be to the country. I was happy to find the attention of the Royal Asiatic Society directed to the subject of curing fishes in India by Dr. Cantor, (vide Proceedings, 21st April, 1838) but a something was then wanting to be known in order to give a direct inducement to the undertaking.* I therefore regard the discovery of the *Ichthyocolla* of commerce in one of the larger *Polynemi* of India as a circumstance eminently calculated to direct attention to a promising and almost unlooked for source of enterprise. We first of all require to know whether more *Polynemi* than one afford it, and to be fully acquainted with the habits and the methods already employed for taking such as do. *Polynemus sele*, *Buch.* is the species I examined and found to contain it; but this species is supposed to be a variety only of *Polynemus lineatus*, which is very common on all the shores to the eastward; it therefore becomes a question of some importance to determine whether *P. lineatus* yields the same valuable article, and if it

* Should Dr. Cantor still be in London, I would recommend those who may be interested in the important question of Isinglass to consult him, as no one is so competent to afford information regarding the fish by which that article is yielded in India. He will, I am confident, on a re-examination of his notes regarding the *Polynemi*, readily distinguish those with large sounds, and be able to afford more valuable information regarding their habits, and the quantities in which they are procurable, than could be expected from any one who had not devoted his thoughts to the subject, during a survey of the place in which these fishes occur. I am not sure that the species of *Polynemus* Dr. Cantor particularly refers to in his paper as the *Salliah*, or *Succolih*, is not the very fish that affords Isinglass; if so, it appears to be considered by Dr. Cantor as a new species, and his notes will probably afford all that is essential to know regarding its habits. Thus, as Sir J. E. Smith somewhere observed, "the naturalist who describes a new species, however trifling it may seem, knows not what benefit that species may yet confer on mankind."

In an interesting account of Kurachee by Lieut. Carloss, read at the last anniversary Meeting of the Bombay Geographical Society, cod sounds and shark's fins are mentioned among the exports from that place, and fishing is said to be carried on to a considerable extent along the coast of Sindh. As however the Cod, *Morrhua vulgaris*, Cuv., is quite unknown in the Indian Seas, the species from which the sounds alluded to by Lieut. Carloss are taken are no doubt *Polynemi*, the larger species of which are sometimes called by the English, Rock-Cod. It will be curious to learn if the Chinese have monopolised this trade on the coast of Sindh as well as in the Hoogly.

be really common to the eastward; if so, it seems strange that the Chinese should send for it to the Hoogly. Next, do the *Pol. Emoi* and *Pol. plebeius*, supposed by Buchanan to correspond with his *Sele*, contain the same valuable substance? and do either of Russell's species, namely, the *Maga booshee* and *Maga jellee*, (Indian Fishes, 183, 184,) yield it? These are questions easily determined along our coasts by merely opening such fish as correspond with the one here figured, and ascertaining whether they contain an air vessel or not, and whether that vessel if present be large or small. Mergui, Batavia, Singapore, Tranquebar, Madras, and Bombay are points at which observations might be made. This question may be so easily ascertained, that it is hardly worth forming a conjecture about it; but if any of the species common to the coasts of the Eastern seas possessed so valuable a property, the chances are that it would have been long since discovered. It is therefore probable that the large gelatine sound will be found to be peculiar to *Pol. sele*, and perhaps *Pol. teria*,* Buch. both of which seem to resort chiefly to the Gangetic estuaries at certain seasons, particularly during the North-east monsoon, when it is easy to imagine that the shelter afforded in those estuaries at that season, might account for many peculiarities which their ichthyology appears to present, compared with that of open coasts. It is during the cold season that the two gigantic fishes above mentioned appear to be caught in most abundance, a circumstance the more favourable to any improved operations that might be resorted to with a view to convert them to useful purposes. Whether both contain the same valuable substance, I am unable to say, having as yet only examined *P. sele*.

GEN.—POLYNEMUS.

Two fins on the back, with long filaments attached to the sides in front of the pectoral fins. Opercula covered with scales; preoperculum serrated behind. Example. The common Mango-fish of Bengal.

YIELDING ISINGLASS.

P. Sele, Buch. Plate —

Sele, or *Sulea* of the Bengalese.

Five filaments, the first reaching from the front of the pectorals to midway between those fins and the anal, the other filaments progressively shorter; no streaks on the sides, lateral line deflected on the lower lobe of the caudal fin. The fin rays are as follows;—first dorsal seven, second dorsal fourteen, pectorals thirteen in each, ventrals each six, anal twelve or thirteen, caudal twenty (?) The teeth are very fine, continuous below round the edges of the jaws, but interrupted at the

* *P. quadrifilis*, Cuv. *P. tetradactylus*, &c. and probably refer to the same.

